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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,042	02/04/2004	Di-Jia Liu	19441-0058	2041

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EXAMINER	
DOVE, TRACY MAE	
ART UNIT	**PAPER NUMBER**
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/708,042	LIU ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *13-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/16/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 3/16/04 has been considered by the examiner.

Election/Restrictions

Applicant's election with traverse of Group I in the reply filed on 2/26/07 is acknowledged. The traversal is on the ground(s) that searching Groups I-IV together would not be an undue burden. This is not found persuasive because inventions I-IV are independent or distinct for the reasons given in the restriction of 1/9/07 and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

Because inventions I-IV are independent or distinct for the reasons given and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper. The requirement is still deemed proper and is therefore made FINAL.

Claims 13-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 2/26/07.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the hydrocarbon fuel". There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the catalyst support". There is insufficient antecedent basis for this limitation in the claim. Note claim 10 does not depend from claim 7.

Claim 10 recites the limitation "the promoter". There is insufficient antecedent basis for this limitation in the claim. Note claim 10 does not depend from claim 7.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-6 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Baker et al., US 4,182,795.

Baker teaches a solid oxide fuel cell (3:1-25) having an anode 114, a cathode 112 and an electrolyte layer 116 there between. Separator plate 118 has passages for supplying process gas to the cathode and separator plate 120 has passages for supplying fuel gas to the anode (Figure 5). The separator plate 120 includes a catalyst coating 121 for hydrocarbon reforming (7:42-65).

As shown in Figure 5, neither the portion of separator 120 that contacts the anode 114 nor the base of the separator contains catalyst 121. Thus the claims are anticipated.

*

Claims 1, 3, 6-9, 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Paz, US 2005/0053819.

Paz teaches the use of an internal fuel reforming catalyst coating on an interconnect that connects individual solid oxide fuel cells. The catalyst coating enhances the rate of internal fuel reformation and improves the thermal efficiency of the fuel cell (0002). As shown in Figure 1, the interconnects sandwich the cathode/electrolyte/anode solid oxide fuel cell structure. The interconnects have flow field channels for the fuel gas and the oxidant gas. The catalyst coating is in fluid communication with the hydrocarbon fuel and preferably includes a base metal and a precious metal (0016). The fuel reformation catalyst is applied to a portion of the surface of the interconnect opposite the anode of the fuel cell or to a portion of the interconnect that is in communication with the fuel provided to the anode (0034). The interconnect is preferably a metallic or ceramic material having the desired shape to effect the interconnection, depending on the type of SOFC prepared. The metallic interconnect may be made from ferritic stainless steel (0054). Additionally, CeO_2 may be used with the precious metal to further improve catalysis. Al_2O_3 or ZrO_2 may be used as a catalyst support material (0031). The electrolyte may be a solid electrolyte such as yttria-stabilized zirconia (YSZ) (0044).

Thus the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 4, 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paz, US 2005/0053819 in view of Patel et al., US 4,567,117 and further in view of Farooque et al., US 5,660,941.

Paz teaches the use of an internal fuel reforming catalyst coating on an interconnect that connects individual solid oxide fuel cells. The catalyst coating enhances the rate of internal fuel reformation and improves the thermal efficiency of the fuel cell (0002). As shown in Figure 1, the interconnects sandwich the cathode/electrolyte/anode solid oxide fuel cell structure. The interconnects have flow field channels for the fuel gas and the oxidant gas. The catalyst coating is in fluid communication with the hydrocarbon fuel and preferably includes a base metal and a precious metal (0016). The fuel reformation catalyst is applied to a portion of the surface of the interconnect opposite the anode of the fuel cell or to a portion of the interconnect that is in communication with the fuel provided to the anode (0034). The interconnect is preferably a metallic or ceramic material having the desired shape to effect the interconnection, depending on the type of SOFC prepared. The metallic interconnect may be made from ferritic stainless steel (0054). Additionally, CeO_2 may be used with the precious metal to further improve catalysis. Al_2O_3 or ZrO_2 may be used as a catalyst support material (0031). The electrolyte may be a solid electrolyte such as yttria-stabilized zirconia (YSZ) (0044).

Regarding claim 2, Paz does not explicitly state the interconnect includes uncoated portions at the anode contact surface. However, Paz teaches the catalytic coating may be applied to only a portion of the interconnect. Many catalysts are costly and it is preferable to apply them only where they are most effective. Paz teaches the catalyst coating is in fluid communication with the hydrocarbon fuel in order to internally reform the hydrocarbon. Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Paz suggests the catalyst coating may be applied to only the portion of the interconnect forming the hydrocarbon fuel passages in order to be more cost effective by reducing the amount of catalyst needed. Furthermore, Patel teaches a solid oxide fuel cell wherein regions of the catalyst member serving to make electrical contact with other regions of the fuel cell be free of the catalyst layer to promote good electrical contact (5:1-62).

Regarding claims 4 and 5, Paz does not explicitly teach the interconnect has an offset plate fin or dimple configuration. However, Paz teaches the interconnect shape is not limited as long as the interconnect is fabricated in a manner to allow fuel and oxidant to reach the anode of a fuel cell and to permit exhaust from the fuel cell. The interconnect may have holes or grooves formed in the interconnect material or the interconnect may be formed to have a sinusoidal shape (0035). Paz teaches the particular configuration of the grooves is not critical to the invention so long as the interconnect includes passages that permit fuel to reach the anode (0043). The courts have ruled changes in shape are generally considered obvious absent persuasive evidence that the particular configuration of the claimed interconnect is significant. See MPEP 2144. Furthermore, Farooque teaches an internally reforming fuel cell having an interconnect structure having an offset plate fin or dimple configuration with a square shape (Figure 7).

Regarding claim 10, Paz does not explicitly teach the promoter comprises an alkali metal oxide or an alkaline earth metal oxide. Paz teaches CeO_2. However, Patel teaches a catalyst internal reforming layer may contain promoters in order to improve activity. Materials such as Co, Cr, Mg, Mn, Ce and rare earth materials can be added. These materials may be in oxide form (7:30-36). One of skill would have been motivated to substitute an earth metal oxide for the cerium oxide of Paz in view of the teaching by Patel that both are known for use in a catalyst internal reforming layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 14, 2007

TRACY DOVE
PRIMARY EXAMINER